

*Abstract of the Disclosure*

A method of using elongate multicellular organisms in conjunction with a specialized flow cytometer for drug discovery and compound screening. A stable, optically detectable linear marker pattern on each organism is used to construct a longitudinal map of each organism as it passes through the analysis region of the flow cytometer. This pattern is used to limit complex data analysis to particular regions of each organism thereby simplifying and speeding analysis. The longitudinal marker pattern can be used to alter signal detection modes at known regions of the organism to enhance sensitivity and overall detection effectiveness. A repeating pattern can also be used to add a synchronous element to data analysis. The marker patterns are established using known methods of molecular biology to express various indicator molecules. Inherent features of the organism can be rendered detectable to serve as marker patterns.

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